Fisheries and Oceans Canada | Pêches et Océans Canada
Science | Sciences

CSAS | **SCCS**

Canadian Science Advisory Secretariat | **Secrétariat canadien de consultation scientifique**

Proceedings Series 2011/064 | **Compte rendu 2011/064**

Pacific Region | **Région du Pacifique**

Regional Science Advisory Meeting of the 2011 Fraser River Sockeye and Pink Salmon Forecast

Réunion de consultation scientifique régional sur les prévisions 2011 pour le saumon rose et le saumon rouge du Fraser

February 4, 2011
Pacific Biological Station
Nanaimo, BC

4 Février 2011
Station biologique du Pacifique
Nanaimo, Colombie-Britannique

Chairperson,
Michael Chamberlain

Président,
Michael Chamberlain

Fisheries and Oceans Canada / Pêches et Océans Canada
Science Branch / Secteur des Science
3190 Hammond Bay Road
Nanaimo, BC V9T 6N7

March 2012 | **Mars 2012**

Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings include research recommendations, uncertainties, and the rationale for decisions made by the meeting. Proceedings also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

Avant-propos

Le présent compte rendu a pour but de documenter les principales activités et discussions qui ont eu lieu au cours de la réunion. Il contient des recommandations sur les recherches à effectuer, traite des incertitudes et expose les motifs ayant mené à la prise de décisions pendant la réunion. En outre, il fait état de données, d'analyses ou d'interprétations passées en revue et rejetées pour des raisons scientifiques, en donnant la raison du rejet. Bien que les interprétations et les opinions contenus dans le présent rapport puissent être inexacts ou propres à induire en erreur, ils sont quand même reproduits aussi fidèlement que possible afin de refléter les échanges tenus au cours de la réunion. Ainsi, aucune partie de ce rapport ne doit être considéré en tant que reflet des conclusions de la réunion, à moins d'indication précise en ce sens. De plus, un examen ultérieur de la question pourrait entraîner des changements aux conclusions, notamment si l'information supplémentaire pertinente, non disponible au moment de la réunion, est fournie par la suite. Finalement, dans les rares cas où des opinions divergentes sont exprimées officiellement, celles-ci sont également consignées dans les annexes du compte rendu.

Regional Science Advisory Meeting of the 2011 Fraser River Sockeye and Pink Salmon Forecast

February 4, 2011
Nanaimo, BC

Chairperson,
Michael Chamberlain

Réunion de consultation scientifique régional sur les prévisions 2011 pour le saumon rose et le saumon rouge du Fraser

4 Février 2011
Station biologique du Pacifique
Nanaimo, Colombie-Britannique

Président
Michael Chamberlain

Fisheries & Oceans Canada/Pêches et Océans Canada
3190, route Hammond Bay Road
Nanaimo, BC/C.-B.
V9T 6N7

March 2012

Mars 2012

© Her Majesty the Queen in Right of Canada, 2012
© Sa Majesté la Reine du Chef du Canada, 2012

ISSN 1701-1272 (Printed / Imprimé)
ISSN 1701-1280 (Online / En ligne)

Published and available free from:
Une publication gratuite de :

Fisheries and Oceans Canada / Pêches et Océans Canada
Canadian Science Advisory Secretariat / Secrétariat canadien de consultation scientifique
200, rue Kent Street
Ottawa, Ontario
K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/

CSAS-SCCS@DFO-MPO.GC.CA

Correct citation for this publication:

DFO. 2012. Regional Science Advisory Meeting of the 2011 Fraser River Sockeye and Pink Salmon Forecast; February 4, 2011. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2011/064.

TABLE OF CONTENTS

TABLE OF CONTENTS iii
SUMMARY v
INTRODUCTION 1
DISCUSSION 1
2011 Fraser River Sockeye Salmon Forecast 2
2011 Fraser Pink Salmon Forecast 3
CONCLUSIONS AND RECOMMENDATIONS 4
APPENDIX 1: CSAP Salmon Subcommittee Meeting Agenda 5
APPENDIX 2: List of Attendees and Reviewers 6

SUMMARY

These Proceedings summarize the relevant discussions and key conclusions that resulted from a Fisheries and Oceans Canada (DFO), Canadian Science Advisory Secretariat (CSAS) Regional Advisory meeting on February 4th, 2011 at the Pacific Biological Station in Nanaimo, B.C. One Science Advisory Report of the Pre-season run size forecasts for Fraser River Sockeye & Pink Salmon in 2011 was peer reviewed.

In-person and web-based participation included Fisheries and Oceans Canada (DFO) Science and Fisheries and Aquatic Management Sectors staff; and external participants from First Nations organizations, the commercial and recreational fishing sectors, environmental non-governmental organizations, and academia.

The conclusions and advice resulting from this review will be provided to Fisheries Management to inform pre-season fisheries planning in 2011.

This Science Advisory Report will be made publicly available on the CSAS Science Advisory Schedule at http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm

SOMMAIRE

Le présent compte rendu résume l'essentiel des discussions et conclusions de la réunion régionale consultative de Pêches et Océans Canada (MPO) et du Secrétariat canadien de consultation scientifique qui a eu lieu le 4 févirer 2011 à la station biologique du Pacifique de Nanaimo, en C.-B.. Le rapport de consultation scientifique des prévisions d'avant-saison concernant l'effectif de la montaison du saumon rouge et du saumon rose du fleuve Fraser en 2011 a été examiné par les pairs.

Au nombre des participants en personne ou par conférence Web, il y avait des représentants des secteurs de la gestion des sciences, des pêches et des océans, d'organisations des Premières nations, des secteurs de la pêche commerciale et récréative, des organismes non-gouvernementaux environnementaux et des universités.

Les conclusions et avis découlant de cet examen seront transmis au secteur de la gestion des pêches aux fins des prévisions d'avant-saison en 2011.

Le présent rapport de consultation scientifique sera rendu public dans l'annexe de consultation scientifique du SCCS à http://www.dfo-mpo.gc.ca/csas-sccs/index-fra.htm

INTRODUCTION

The Centre for Science Advice Pacific (CSAP) Salmon Subcommittee met February 4, 2011 at the Pacific Biological Station in Nanaimo to review the 2011 Fraser River Sockeye and Pink abundance forecasts. The forecasts were presented as a Science Advisory Report (SAR) although through discussions with the RAP and with clarification from the Regional CSAP coordinator it was decided that the reviewed document would be considered a technical document to append within these proceedings (Appendix1). A SAR was produced out the technical document which summarized the 2011 forecasts and conclusions of the RAP.

The subcommittee was comprised of representatives from Fisheries and Oceans Science and Aquatic and Fisheries Resources branches, industry, First Nations, and NGO's.

During the introductory remarks, the objectives of the meeting were reviewed and the participants accepted the meeting agenda; the chair then reviewed the rules of exchange for the meeting reminding participants that the meeting was a science review and not a consultation. The meeting room was equipped with microphones to allow for the operation of the Webinar™ and allow for participants to engage in the review remotely and participants were reminded to address comments and questions so that they could be heard by participants online.

The Chairperson outlined to the participants that everyone at the meeting had equal standing as participants as there was no observer status at the meeting. Finally, the objective was to achieve consensus at the meeting the chair discussed the rules and definition around a consensus decision which was accepted by the sub committee.

The meeting participants reviewed the technical document which is presented in Appendix 1. The meeting agenda appears as Appendix 2. A list of meeting participants and reviewers is included as Appendix 3. The Terms of Reference is attached as Appendix 4

DISCUSSION

Working Paper: Pre-season run size forecasts for Fraser River Sockeye & Pink Salmon in 2011 by Grant, S and MacDonald, B

Presentation: S. Grant

Pre-season abundance forecasts of returning Fraser River adult Sockeye and Pink Salmon in 2011 were requested by Fisheries and Oceans Canada (DFO) Fisheries Management. Forecasts are used for pre-season planning purposes and for in-season management. They are most useful early in the summer fishing season before increasing reliance on in-season run size estimates. Forecasts are produced by DFO as agreed under the Canada-United States Pacific Salmon Treaty. As a result of changes in stock productivity in recent years, a detailed review of the 2010 Fraser River Sockeye forecast methodology was completed in 2010 (Grant et al. 2010). The 2011 forecasts for Fraser River Sockeye were based on these methodologies. The methodologies used to forecast Pink Salmon abundance were last reviewed in 2007.

Following the presentation of the 2011 Sockeye and Pink Salmon forecasts and clarifications around the presentation, the RAP discussed the working paper and the acceptable format for its presentation and publication. It was suggested by the Chair that the document presented (originally intended to be the SAR) be reformatted and published as a Research Document so

as to preserve the data tables and additional information presented which were required for the review, but deemed inappropriate for a SAR. The group debated the merits of this approach in the context of the peer review requirements for review of a Research Document. The group found that while the methods used to forecast returns in 2011 were based on an approved research document and that the authors were consistent in the application of these methods the participants were not comfortable considering it 'peer reviewed'. Following some clarification by the Regional CSAP Coordinator, participants agreed to append the document reviewed during the RAP as a technical appendix (appendix 1) and to condense the document, its conclusions and advice into a new SAR. The SAR was distributed, reviewed and approved by participants following the meeting.

2011 FRASER RIVER SOCKEYE SALMON FORECAST

The 2011 Fraser River Sockeye Forecast was conducted using methods detailed in the 2010 Sockeye Forecast Research Document. This document was reviewed and approved by CSAP in 2010.

The RAP began discussions following the presentation by the authors and clarified the appropriateness of the methods despite the low spawning abundance in 2007. It was concluded that while the numbers were low the Effective Female Spawners (EFS), while also low was still within the historical distribution and as such there was no need to review the models

Discussion was then held regarding the presentation of the productivity time series as arithmetic means in the forecast tables. The group required clarification as to the use of arithmetic means in the calculations of productivity in the forecast tables (not the forecast themselves), given data used in the actual forecasts assumes lognormal errors (geometric means).

- It was agreed that that the productivities calculated from long-term average forecasts differ from the "long-term" reference period productivities in the tables because table productivities are arithmetic means, causing for misleading interpretation because the columns are not comparing the same thing (Example: Early Stuart long-term average forecast productivity is much higher than the reference period productivity).
- It was agreed that the authors would present consistent productivities, (i.e. re-calculate reference period to geometric means). There was also agreement to align reference productivity and forecast productivities so that they are more comparable (only the 4-year old returns will be presented so that the productivities are more comparable).

The group then discussed the appropriate use of retrospective analysis, specifically the choice of performance measures used to evaluate model selection for each stock's forecast. Discussion was centered on the appropriateness of using an average retrospective analysis model rank across the four performance measures versus using ranks from a single performance measure. The PSC suggested using MPE as the preferred performance measure, which gives equal weight to each year in the retrospective analysis regardless of the run size (errors are scaled by run size). The group did not provide specific guidance on which performance measure was most appropriate for the 2011 forecasts. It was agreed that for 2012, FAM would have to request which performance measure most aligns with their objectives (eg. minimizing absolute deviations vs. minimizing scaled deviations) and that will be used for the 2012 Fraser Sockeye forecast. This would be provided in the 2012 forecast request for Fraser Sockeye.

The group provided advice on the use of preliminary 2010 return data to forecast age-5 recruits for some stocks depending on the Fraser Sockeye forecast scenario ('Recent Productivity' versus 'Long-Term Average Productivity'). Previous years forecast generally do not include productivity information from the previous year to forecast age-5 returns. However, given the productivity extremes observed in the last two return years consideration has been made for how those productivities would affect the five year old returns since these fish would have experienced similar survival conditions to four year old fish that returned the previous year. The RAP suggested the authors take the 2010 data in to account to predict 5-year olds (in the "Recent Productivity" scenario) and to separate out the 4 and 5-year olds for forecast; forecast 5-year olds using 2010 productivities and 4-year olds using chosen model for the recent productivity scenario. This was suggested to avoid biasing the forecasts low by underestimating the contribution of the five year olds, which will have likely experienced higher productivities than the fishing returning at age-4.

It was cautioned that sibling relationships are highly uncertain and while the authors expected that the strong low productivity signal of 2009 would persist into the 5-year old return in 2010, in 2010 the signal was not as consistent.

Finally, the group discussed the use of environmental variables as covariates in predicting returns. It was reiterated that no suite of indicators that have proven to be most appropriate for predicting survival of Fraser Sockeye and that most used in modeling do not have a large effect on the forecast. It was recommended that a more thorough incorporation of environmental variables still be considered in future forecasts and that a workshop with variables and datasets to look into predictive potential of alternative environmental variables may aid in this process.

2011 FRASER PINK SALMON FORECAST

RAP discussion on the 2011 Pink Salmon abundance forecast revolved around the data used to construct the recruitment to escapement model. Questions were raised regarding the data used within the model, specifically towards how escapement estimates were derived. It was confirmed that direct estimates of escapement ended in 2001 and that from 2003 to present (four data points) were derived from test fisheries only. The RAP suggested exploring the use of fry production to back-calculate historical returns and to adopt fry output (which is consistently assessed) as the primary focus of stock strength and not escapement which is not measured directly.

Following discussion of the escapement data used for the model inputs, the authors confirmed that retrospective analysis for Pink Salmon forecast model selection was last conducted in 2007 and that recent year's juvenile data, especially 2011, were outside of the historical average from which the model was developed. It was suggested that the data used in the forecast model be presented within the technical document and that an overview of the uncertainties or deficiencies within the escapement estimation programs be provided.

The RAP agreed that uncertainties in the escapement data (adult abundance estimates and fry estimates), and the extrapolation of the forecast model beyond the range of historic data will increase the uncertainty of the forecast.

The RAP agreed that as Pink Salmon continue to rise in profile in regards their importance to fisheries planning and contribution to freshwater and marine ecosystems, a review of

forecasting and escapement enumeration methods may be required. It was suggested that Fraser River Pink Salmon data used within the forecast be made publicly available.

CONCLUSIONS AND RECOMMENDATIONS

The Science Advisory Report was accepted with revisions as described in the preceding discussion section. Several recommendations for further research or alternative assessment approaches are also contained in the discussion.

APPENDIX 1: CSAP SALMON SUBCOMMITTEE MEETING AGENDA

CENTRE FOR SCIENCE ADVICE PACIFIC
SALMON SUBCOMMITTEE MEETING

February 4, 2011
Pacific Biological Station
Seminar Room
Nanaimo, BC

Friday February 4, 2011

1. Introduction and procedures 9:00 - 9:30

2. Review:
   Pre-season run size forecasts for Fraser River Sockeye & Pink Salmon in 2011

   - Presentation 9:30 – 10:00
   - Points of Clarification 10:00 – 10:30
   - Review: 2011 Sockeye Forecast
     2011 Pink Forecast
     Conclusions and Advice
     10:30 - 4:00 (if required)

3. Adjournment

APPENDIX 2: LIST OF ATTENDEES AND REVIEWERS

Subcommittee Chair: Michael Chamberlain
CSAP Chair: Marilyn Joyce

Last Name	First Name	Affiliation	Attend
DFO Participants			
Candy	John	Science SAFE	√
Cass	Al	Science	√
Chamberlain	Michael	SA Fraser-BCI	√
Folkes	Michael	Science SAFE SA	√
Grant	Sue	SA Fraser-BCI	√
Grout	Jeff	FAM RHQ Salmon	√
Hargreaves	Brent	FAM RHQ Salmon	√
Holt	Carrie	Science SAFE	√
Holtby	Blair	Science SAFE	√
Huang	Ann-Marie	FAM LFA	√
Hyatt	Kim	Science SAFE SA	√
Irvine	James	Science SAFE	√
Joyce	Marilyn	Science CSAP	√
Kristmanson	Jim	Science NHQ	√
MacDonald	Bronwyn	SA Fraser-BCI	√
McHugh	Diana	FAM LFA	√
Porszt	Erin	Science SAFE	√
Rosenberger	Barry	BCI Area Director	√
Saunders	Mark	Science SAFE	√
Sawada	Joel	Science SAFE SA	√
Scroggie	Jamie	FAM BCI	√
Tompkins	Arlene	Science SAFE SA	√
External Participants			
Atkinson	Mary-Sue	Pacific Fisheries Resource Conservation Council	√
Bison	Robert	Province of BC	√
Blackbourn	Dave	DFO Scientist Emeritis	√
Hill	Aaron	Watershed Watch Salmon Society	√
McCallum	Brent	PSC Fraser Panel SFAB rep	√
Michielsens	Catherine	Pacific Salmon Commission	√
Murray	John	PSC Fraser Panel	√
Pestal	Gottfried	Contractor	√
Riddell	Brian	Pacific Salmon Foundation	√
Staley	Mike	Fraser River Aboriginal Fisheries Sec.	√